ABSTRACT

Methods and computer readable media are disclosed for ultimately developing a dosimetry plan for a treatment volume irradiated during radiation therapy with a radiation source concentrated internally within a patient or incident from an external beam. The dosimetry plan is available in near "real-time" because of the novel geometric model construction of the treatment volume which in turn allows for rapid calculations to be performed for simulated movements of particles along particle tracks therethrough. The particles are exemplary representations of alpha, beta or gamma emissions emanating from an internal radiation source during various radiotherapies, such as brachytherapy or targeted radionuclide therapy, or they are exemplary representations of high-energy photons, electrons, protons or other ionizing particles incident on the treatment volume from an external source. In a preferred embodiment, a medical image of a treatment volume irradiated during radiotherapy having a plurality of pixels of information is obtained.